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land, N. Y., a young specimen of *Chaetodon ocellatus* Bloch was thrown out on the sand by a rather heavy surf that was driving ashore before strong southerly winds. The fish measures 30 mm. in total length including caudal.

This butterfly fish has been recorded frequently in Buzzards Bay between August and November, and also in Narragansett Bay. Near Woods Hole, Mass., twenty or more have been seined in the eel-grass patches during single days in September and October. In Long Island waters, however, the species is known to have been taken only twice previously, both times during October, and only in the shallow waters of Gravesend Bay. It is of interest and probable significance, to note that its presence in the open sea off Long Beach on October 12 was coincident with a southeast wind, which had arisen just before midnight of October 11, and which increased steadily in force to a maximum of 56 miles per hour (New York City) at 3:55 P. M., October 12. The influence of this wind was apparently reflected in the temperature of the sub-surface water of New York harbor, for after it had fallen steadily from 65° F. on October 5 to 62.5° F. on October 11, it rose again one-half degree Fahrenheit on October 12.

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## BUFO FOWLERI IN MICHIGAN, INDIANA AND ILLINOIS.

Fowler's Toad has recently been shown to have a widespread distribution along the Atlantic Coast. Its range is much wider still, as it occurs in Michigan, Indiana and Illinois. The only definite records found by the writer, for the Middle West, are based on collections from Barrien County<sup>1</sup> in southwestern

<sup>1</sup> See Ruthven, Occ. Pap. Mus. Zool. Univ. Mich., 47, October 13, 1917, pp. 1-5, pl. 1.

Michigan. From all these reports it appears that *Bufo fowleri* tolerates comparatively dry, sandy conditions. Confirming and extending these observations, the writer has found the species to be quite common in the sand dune region skirting the southern shores of Lake Michigan. These dunes in Indiana are crossed and recrossed by the tracks of this toad, and the beach shows similar evidences of their incursion, the windrows of insects along the shore probably accounting for their presence there.<sup>2</sup> Adults were secured near Mineral Springs and near Miller, hopping about in the dunes at twilight and dusk, and on cloudy afternoons. The color and maculation of Fowler's Toad matches the sand very well; its agility is necessary to enable it to hop up the dunes of shifting sand.

The young of *Bufo fowleri*, from 16 to 22 mm. long in body length, were found in the sand dune region near Miller, Indiana, on September 23, 1917. They were hopping about in abundance in the middle of the sunny day, along the flat sandy shores of certain ponds containing a moderate amount of vegetation, but not along those parts of the shore where shrubs and trees grow in and near the water. When chased into the water they refused to dive, but swam on the surface, throwing their heads back rather violently when taking breath. More often they took to the dunes, which they climbed with the characteristic agility of the species. One was found half buried in the dry sand. Similar specimens, from 10 to 24 mm. long, were caught under sticks and stones about the first ponds back of the beach at Pine, Indiana, on September 30, which was a cold, windy day. These ponds were just becoming captured by *Chara*. Some of the toads were found a fourth of a mile from the ponds, but always in moist sand near the beach; far-

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<sup>2</sup> Dr. Shelford described this situation in his *Animal Communities in Temperate America*, (1913, p. 222), but recorded the species as "the common toad."

ther inland, where the *Chara* of the ponds is becoming replaced by lilies and rushes, and where the soil is becoming converted into dark humus, an adult female and a young specimen (26 mm. long) of *B. americanus*, but none of *B. fowleri*, were found on the same date. All of the distinctive characters of the two species concerned are evident in the young, quite as well as in the adult. The belly is glossy white, often with a dash in the middle of the breast, and sometimes with a limited amount of further maculation. The upper sides are colored very much like the sand; the bluish-gray ground color is mottled with greenish; the warts are reddish; the black spots often appear as rings surrounding the red warts.

Other typical specimens of *Bufo fowleri* are at hand from Pikeville, Indiana (September 2) and La Porte, Indiana (July), and from the sand dunes at Waukegan, Illinois (June 8); the largest individual examined, a female 75 mm. long comes from Muskegon County, Michigan. Under the name of *Bufo lentiginosus* var. *lentiginosus*, H. Garman<sup>3</sup> has recorded a toad which is probably *Bufo fowleri* from Anna and Villa Ridge, southern Illinois. He wrote: "Attention was called to these toads by the peculiar note they uttered, a note quite unlike the trill of the toads which collect in the ponds in central Illinois in the spring of the year. The note consists of a prolonged and rather shrill scream repeated at short intervals at dusk in summer evenings. The toads themselves were more active than their more northern cousins." The description he gives of these toads agrees most closely with *B. fowleri*, but the reduced size of the spots and the rather elevated cranial ridges he mentions, lend some doubt to the determination. It is probable that several other records of *B. americanus* in the Great Lakes and upper Mississippi Valley regions refer rather to *B. fowleri*.

<sup>3</sup> Bull. Ill. State Lab. Nat. Hist., 3, 1892, p. 335.

The American Toad is not represented in the collection examined from the sand dunes about Lake Michigan, but it does occur plentifully in other habitats. Specimens of *Bufo americanus* have been examined from La Porte, Indiana (July), and from various localities in and about Chicago, such as Jackson Park; West Pullman; Glen Ellyn; along Hickory Creek between New Lenox and Joliet; on the clay bluffs at Winnetka, and from dark soil in the uplands at Waukegan (all in Illinois); also from Pine Station, and from between the Grand Calumet and Little Calumet Rivers, both in Gary, Indiana. Thus it appears, in the region about the southern end of Lake Michigan, that the two species of toads are more or less complimentary in their distribution, *B. fowleri* inhabiting the drier and sandier regions. Throughout this area the species seem to be readily separable, their distinctive characters being almost always well-marked. That these specimens of *B. fowleri* are typical has been further assured by their comparison with eastern material kindly loaned by the American Museum. The only difference noted consisted in the fact that the cranial ridges are separated a little more widely from one another than in the Atlantic Coast series. The same difference has been noted by Ruthven, but it is not constant.

The hypothesis of the occasional hybridization of *Bufo americanus* and *B. fowleri*, already suggested, receives support from the study of a series of toads from Olive Branch, near the southernmost tip of Illinois, collected by C. M. Barber on May 7-8, 1907. Some of these toads are typical of *americanus*, some correspond wholly with *fowleri*, yet others can be referred to neither species, all of their characters being variously intermediate and mixed.

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